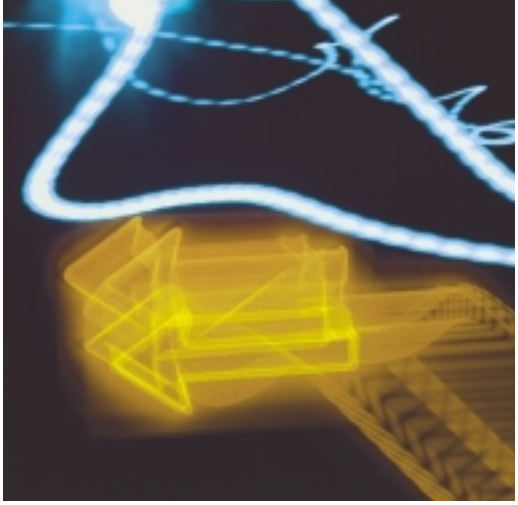

Failure to grasp what makes an architecture valuable can thwart the best of plans.

Mark Boster, Simon Liu, and Rob Thomas

Getting the Most from Your Enterprise Architecture

ABC Corp. hired a new CIO, secured a reputable contractor, and was looking forward to the creation of an enterprise architecture. True, the last EA initiative had slipped its schedule and gone way over budget, but that was because of a contract problem. This time, ABC had specified a fixed-time, fixed-cost contract. The new CIO and contractor launched a major marketing effort, forming user groups and creating promotional flyers. The CEO was excited, and developer morale was high. Six months and $1 million dollars later, the contractor delivered 20 pounds of EA documents with elaborate graphics. There was little doubt that the EA architecture team would deliver on its promises. Everyone looked forward to a rapid and relatively effortless implementation.

Less than a month later, ABC was in a slump. Only a few people understood the architecture document. The team complained that the standards were too rigid, and the process to enforce compliance was tedious and time-consuming. ABC's managers were less optimistic but considered the setbacks a small price to pay for the eventual large returns the EA would provide. Three months later, users began complaining that changes were taking forever, the EA implementers were no longer following the standards, and the entire organization was looking for someone to blame for the "EA fiasco." The CIO responded by removing the lead architect and reorganizing the architecture team. The problems persisted. A year later, the CIO resigned, and ABC scrapped the EA effort.

Sadly, this scenario is fairly typical. Organizations assume that an EA will automatically add business and technical value. They see the effort as a one-time activity—we make a big push up the hill, then we can relax and coast down. Unfortunately, downhill is exactly where the EA goes with this attitude. An EA is only a *precondition* for creating architecture value. It is not a guarantee of long-term reward. Organizations that don't see this invariably set themselves up for disappointment.

Why organizations assume that an EA will provide value is somewhat perplexing. Most people will agree that having 11 players in soccer uniforms does not mean you have a valuable soccer team. It takes planning, motivation, and agreement on how to win games. It takes repeated wins for people to see that the team adds value. Problems are ongoing, and strategies must be flexible enough to withstand change over the long term. An EA effort is no different.

But the soccer analogy breaks down on one important point: Everyone agrees that winning games is what makes the team valuable. If the team doesn't win, its financial backers pull their support. Thus, all strategies revolve around winning games. In most EA efforts, in contrast, the business owner decides that an EA should be built, but may have only a vague idea of why. On the basis of that fuzzy idea, the architecture team plans how to build the EA, and the developers

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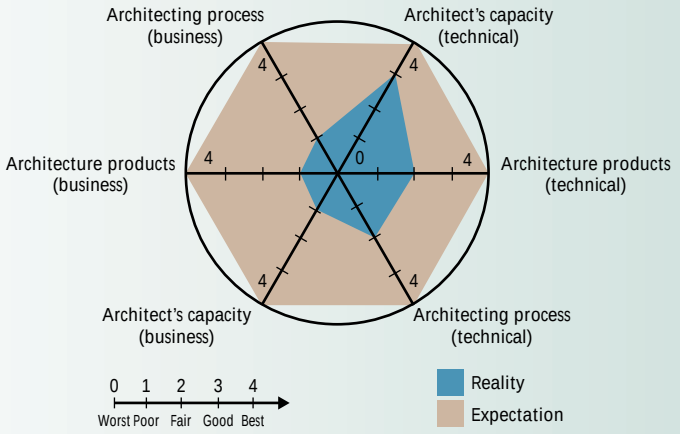
Figure 1. Measuring the value of an enterprise architecture.



Value has three dimensions: the architect, the process to build the EA, and the architecture and its products, such as the architectural drawings and models. The blue area illustrates the real value of most EAs. The tan area depicts the expected value, which is typically higher. Within each dimension are the technical and business perspectives, both of which are critical to an EA effort. Most efforts emphasize technical problems but virtually ignore business needs. This leads to an even wider expectation-reality gap in each dimension.

build it. Efforts to sell the EA, which are also based on the fuzzy idea, raise stakeholder expectations. When implementation begins, it is a nightmare, as everyone realizes that the EA has far less value than they thought. Yet because the effort began with only a vague idea, it is logical that planning would lack purpose, and the EA orchestration would fall apart.

An EA effort is a huge undertaking. We know of one organization that, after enduring two failed EA efforts, is now on its third—five years and more than $5 million (and counting) later. In the face of these staggering costs, why does this attitude persist? We believe it is largely because there is no systematic way to analyze and define value. If organizations had a way to systematically analyze value and base their EA planning on the solid results of this analysis, the expectation-reality gap would narrow.

WHAT IS VALUE?

We can sum up an EA effort in this broad statement: An *architect* follows some *process* and produces some *architecture*. From this, we see that an EA effort has three value contexts, or dimensions: architect, process, and the final products—the architecture itself and related products, such as the architectural drawings and models.

Within these dimensions are certain implications. A process implies that something goes on—even after the product is complete. Having people (architects) working together implies that the process will almost certainly be both political and technical.

These implications fall roughly into two groups:

- the technical perspective—"how we do it" and
- the business perspective—"what we want to get from all this."

The need for a technical perspective is clear, but a business perspective is equally valuable. Anyone who has led an EA effort knows negotiations for world peace pale by comparison. The first two EA efforts in the ABC Corp. died from lack of political support. The CIO was the project's main supporter. When the organization changed CIOs, there was not enough additional support to keep the project going.

In the architecture dimension, a system that is technically flawless but useless from a business perspective fails just as grandly as a system that would be wonderful if it ever ran more than a day without errors. We have seen a multimillion-dollar EA become shelfware after its organization reengineered its business processes. For some reason, the organization did not do this before the EA effort, and the EA did not have enough flexibility to accommodate the business process changes.

THE EXPECTATION-REALITY GAP

Given that both the technical and business perspectives are important, it makes sense to look at value in these terms. Unfortunately, although most efforts have no problem focusing on the technical perspective, they tend to ignore the business side of things. As Figure 1 shows, the expectation-reality gap is considerably wider on the business perspective side, but each dimension has gaps in the technical perspective as well.

How the architect contributes

As Figure 2 shows, most organizations do not see the relevance of the business perspective in selecting an architect. If you are among those who think an architect doesn't need a business perspective, consider Bill Gates, who left his position as Microsoft's CEO to become its chief architect. If you ask most people what qualities a CEO must have, they will invariably emphasize the ability to deal with corporate politics and the need for a variety of people skills. If you ask the same people what qualities an architect should have, they will say things like, "knows client-server architecture and has experience doing system modeling and trade-off

analysis." Business savvy doesn't usually make the list. Yet a sound sense of business strategy is vital to fitting the architectural approach to the customer's problems. Moreover, architectures are seldom embraced without considerable challenge from many fronts. The architect can't be "above" the politics. Instead, he must work hard to sell the architecture to the various stakeholders. He must launch an aggressive marketing campaign during each development phase. Getting buy-in to the architecture vision is not enough. Anyone involved in implementing the architecture must understand it, which means creating tutorials for those applying the architecture and being available to answer questions about its application.

The focus on the technical perspective is easy to understand if you look at the source of most architects. Organizations tend to promote top-notch technologists to architects, expecting that they can then expand their expertise. Some promote them just to keep them from going elsewhere. Unfortunately, even a superb technologist may lack the broader business talents and political skills that would make him a good architect. Thus, the strong technologist (who is accustomed to succeeding and who actually liked his work) is thrown into the muck of organizational politics and communication demands, where he rapidly becomes overwhelmed. He is then forced to limp along, leave the organization, or take a crash course in people skills. None of these options characterize the strong leadership needed in an EA effort.

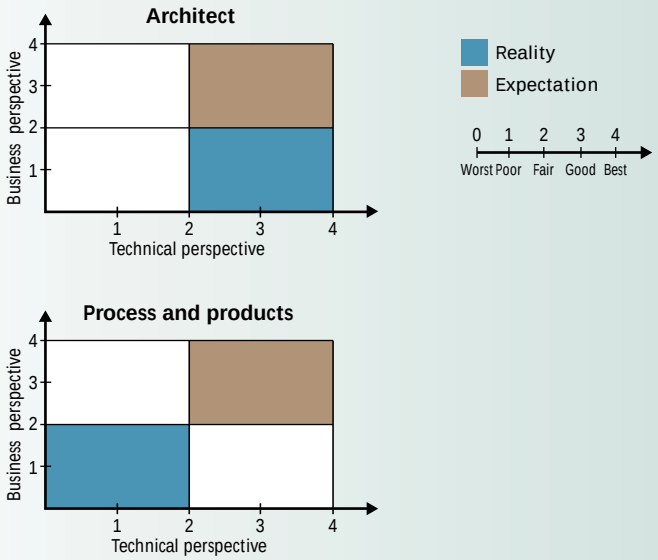
Thus,

- ***Expectation:*** Everyone will understand and accept the architect. Every project will follow the architect's plan.
- ***Reality:*** Only a few people understand the architect. Only people who believe in the plan accept the architect. Projects follow the architect's plan only if the CTO or CIO mandates it.

How the process contributes

Many articles and reports cover the architecting process but primarily from a technical view. In fact, as Figure 2 shows, most organizations fail to see that the architecting process has a business part at all. The technical perspective includes steps and heuristics for creating a good architecture. These are, of course, critical to the EA's success. But so is the business part, which includes steps to ensure that the architecture is successfully implemented. Architecting is a game of influence. The process needs business and political support as much as it needs technical support. The right balance of technical and business activities is crucial.

Figure 2. Breaking down the expectation-reality gap by value dimension.



In each dimension, there is a business and a technical perspective. The expectation is for the architect to have a good-to-ideal business and technical perspective. In reality, architects tend to have a good-to-ideal technical perspective but at most a fair business perspective. The expectation is for the process to have a fair-to-ideal technical and business perspective. In reality, most organizations use immature processes that have at most a fair technical and business perspective. Finally, the products are expected to be fair to ideal when in reality they again have only a fair technical and business perspective.

As Figure 2 shows, most organizations see the value of technical support. They follow engineering disciplines, use appropriate techniques and methods, and provide the right tools. Business activities seem to be less valued, however, which is why projects suffer from insufficient resources or management cancels them when it loses interest. It is also why projects are stalled with endless infighting or a lack of leadership and why developers ignore or resist the architecture.

Often, organizations see EA development and the process of getting value from an architecture as something that can be done ad hoc. We have seen an EA project go through a start-stop-resume cycle repeatedly, according to whether or not funds were available. Another popular misconception is that you build an EA and value will "just happen." We can't emphasize enough that value does *not* unfold naturally from building an EA. Without systematic technical analysis, purposeful business thinking, and careful political orchestration, an EA project can quickly

degenerate into a liability that distracts management and wastes resources. The organization may lose its competitive edge.

Thus,

- ***Expectation:*** The process is mature enough to build an EA that will cut IT costs and cure IT problems. We'll see change soon after the EA is developed and implemented.
- ***Reality:*** The process is not mature enough to address business problems. The EA effort is only one way to analyze IT costs and understand IT problems. Change happens over time, and the process to effect change is continual and sustained.

How the product contributes

The focal deliverable of the architecting process is the set of architecture documents. These architecture products incorporate a series of principles, guidelines, drawings, standards, and rules that guide an enterprise through acquiring, building, modifying, and integrating IT resources. These resources include hardware, software, communication protocols, application development methodologies, database systems, and modeling tools.

Most current architecture products focus almost exclusively on technical concerns. They are full of engineering drawings but contain few or none of the models and measures familiar to business people. Because business-oriented stakeholders can't understand them, they find no business value in the products. They express their lack of interest by pulling their support (translation: by "putting away their wallets"). We've seen an organization abandon its 2,000-page EA because no one but the chief architect understood the product.

Architecture products need to contain models and measures that business-oriented stakeholders can understand.

Drawings need not be so difficult to understand. According to Bernard Boar, author of the seminal book on architecture representation schemes, good products use pictorial graphics, textual presentations, and notation rules to rigorously depict requirements. They address business problems in familiar business language. This isn't the practice in most organizations. Drawings use no meaningful or repetitive notation, notation levels are confused and intermixed, and drawings fail to communicate architectural characteristics of interest to business people, such as interoperability and scalability.

Thus,

- ***Expectation:*** Everyone will understand the architecture and its underlying principles. Business people will appreciate the smart design and elegant notation. Everyone will see the same thing, so implementation proceeds smoothly. The desired results will occur shortly after implementation.
- ***Reality:*** Business people are bewildered by architectural drawings and thus find little or no value in the architecture. Notations are inconsistent, and design principles are hard to see. Implementation is hampered by multiple views of the architecture. It takes longer and uses more resources than planned. Support flounders, and the EA either becomes shelfware or is implemented only because so much has already been spent on its design.

NARROWING THE GAP

To align expectation and reality, organizations must change some of these prevailing practices and attitudes. Even small changes in each value dimension can benefit the overall EA project.

Use a defined process

Although we've been addressing the three value dimensions—architect, process, and product—in order, process is the first dimension an organization should evaluate for change. You can't select the right kind of architect if you don't understand the activities involved in the process. Your products also depend on the process. In short, you *must* follow some defined process.

Whether or not you have a *defined* process, you are using a process of some kind; you just haven't articulated and documented it. You can begin defining your own process or save yourself some time and use one of the several good process models already out there. Aim for a model that balances technical and business activities. Most existing models emphasize technical activities, but architecting is an ongoing, iterative, technical, and political process. We suggest using the five-step process outlined by Frank Armour and colleagues in "Building an Enterprise Architecture Step by Step" (*IT Professional*, July/Aug. 1999). Table 1 summarizes the business and technical activities in each step.

Initiate the effort. Begin by reviewing the strategies that drive an organization. Looking at the business model will help you establish operational concepts. Start with the strategic, business, and annual plans. As you gain more insight into the business and technical needs, you can begin assembling the architecting team and defining the EA's contents and boundaries.

A big step in this phase is to plan for change—because, as Boar points out, change is inevitable. You must create a readiness for change that includes helping the team and all parts of the organization overcome their resistance.

Motivation is a big part of this effort. Neither individuals nor organizations will change unless they see a compelling reason to do so. Also, motivations will differ, depending on the part of the organization. For example, business people will be motivated by lower costs, developers by ease of implementation, and operations personnel by flexibility.

Another crucial step is to select an architecture framework to help govern EA activities and organize your EA information. Many good frameworks are available, such as those from the Zachman Institute for Framework Advancement (http://www.zifa.com), Meta Group (http://www.metagroup.com), the Federal Enterprise Architecture Framework (http://www.itpolicy.gsa.gov/mke/archplus/archhome.htm)—a US government EA initiative, and Open Group (http://www. opengroup.org/public/arch). No one framework is generally better than another. Which one you choose depends on the architect's preference and experience.

Describe where we are. This is a grounding phase. It is neither an operational review nor an audit. Rather, you are assessing and characterizing the current environment. The assessment helps you define a baseline or starting point for architecture development. In the first phase, your goal was to overcome the resistance to change. In this phase, you want people to see the need for architectural change, and you want to convey positive and believable expectations about it. Gather information about how the organization currently functions and compare it with desired operations. Use any significant discrepancies between the actual and desired states to motivate organization members and gain support for the needed change.

Identify where we'd like to be. This is the heart of the architecting process, in which you define architectural components and their attributes and relationships. Aim to have an organized set of definitions and models with drawings that describe the desired state. Two important business activities are to communicate valued outcomes and features and energize the initial commitment to the architecture. Valued outcomes describe the specific performance and outcomes the organization would like to achieve, for example, "Make information available anytime, anywhere, worldwide." You can use valued outcomes as goals for the architecting process and as standards to measure progress. Valued features specify what the organization should look like to achieve the valued outcomes, for example, "Implement fault tolerance to make information available anytime."

Both valued outcomes and features create a target that is an emotionally powerful motivator for organization members to persevere in adapting to change.

Table 1. Activities in a five-step process to build an enterprise architecture. Most organizations lack a defined process such as this one that helps ensure a balance between technical and business concerns.

Process step	Technical activities	Business activities
Initiate the effort	Develop an architecture framework Build the architecture team	Create readiness for architecture Overcome resistance to change Identify and influence stakeholders Encourage open participation and involvement Reveal discrepancies between current and desired state
Describe where we are	Characterize the baseline architecture	Make it clear to everyone why change is needed Convey credible expectations Communicate valued outcomes
Identify where we'd like to be	Develop the target architecture	Communicate valued features Energize commitment Create a plan for transition activities
Plan how to get there	Develop the transition plan Execute the target architecture	Communicate the transition plan Establish sound management structure Build support for the architect
Implement the architecture	Maintain/enhance the target architecture	Develop new competencies and skills Reinforce architecting practices

What Organizations Expect and What They Get

The development of an EA is often perceived with great expectations of benefits and value. Unfortunately, reality can be cold and hard. Here are some common mismatches.

➤ ***The EA will cut IT costs and solve IT problems. We'll see an immediate change.***

Reality ... **The EA effort merely helps the organization analyze IT costs and understand IT problems. It provides an opportunity to get more value from the architecture, but realizing that value takes time and a long-term strategic process.**

➤ ***Everyone will talk to the EA architect. The architect will be an excellent leader and motivator. Every project will gladly follow the architect's guidance.***

Reality ... **The architect is usually a technologist and doesn't have a strong business perspective or business skills. Projects won't follow him unless someone makes them.**

➤ ***The architecture will be an invaluable source of direction and guidance. It will be open and adaptable. It will promote interoperability*.**

Reality ... **Architecture standards inhibit progress. Procedures for architecture compliance increase bureaucracy. Architecture models and standards are rigid and inflexible.**

Plan how to get there. This phase links the reality of the present with the desirability of the target architecture. The team identifies projects and establishes practical migration stages. They prioritize the identified steps according to business objectives, interproject dependencies, and the results of cost-benefit analyses. Finally, they establish responsibilities to ensure that the steps are carried out and that the migration plan is properly updated. An important business activity is to create a road map for architectural change. The map cites specific activities and events that must occur if the transition is to be successful. It should gain top-management approval, be cost-effective, and be flexible enough to respond to feedback during the process. The team must also plan how to interact with and influence key people and groups whose commitment they need to enable the change.

Implement the architecture. The main goal of this phase is to execute the transition plan and keep the architecture alive and well by continuously improving it. You must insert the architecture into the business and technical decision-making process. You may need to adjust architecture decisions in accordance with unforeseen changes in business directions or in technology advances or availability. An important business activity is sustaining the momentum for the architectural changes, thereby ensuring that you can complete the change. Part of this activity involves providing resources to implement the changes, building a support system for architects, developing new competencies and skills, and reinforcing the new practices needed to implement the changes.

Define the architect's competencies

As Table 2 shows, the architect's business and technical role changes as the architecting process unfolds, but the architect must consistently demonstrate two core skills: leadership and communication. We have repeatedly seen an architecture team without leadership thrash and diverge. A strong leader infuses the team with a common vision, motivating them to do their best work. The ability to communicate is also important in building coalition. As Dana Bredemeyer, head of a consultancy that advises on EA effort notes, the most important thing an architect must do is to communicate, communicate, communicate.

Initiate the effort. The architect is a visionary who must build the architecture team and influence business strategy. To gain and maintain management sponsorship and the enthusiastic support of key players, an architect must understand both their business and personal objectives and get them personally committed to the architecture's success. This means listening, networking, articulating and selling a vision, and doing all this continuously over the project's life.

Describe where we are. The architect must set up efforts to interview users, survey and characterize existing systems and environments, and develop the baseline architecture. He must be investigative, insightful, tolerate ambiguity well, and be skillful in working consistently at an abstract level. He must be intimate with the product domain, relevant technologies, and development processes. This step requires an overall system view. The architect builds models of the problem and solution space and explains the baseline architecture to sponsors and stakeholders.

Identify where we'd like to be. The architect must understand business and customer needs, identify significant market and technology trends, articulate and refine architectural requirements, and develop the target architecture. He must solidly understand the organization's business strategy and underlying rationale, what drives the organization's success, and how the competition works. He must build and maintain consensus within the organization even though he has no direct authority over management chains.

Plan how to get there. The architect must analyze tradeoffs and develop practical transition plans to move the organization from where it is to where it wants to be. An

effective architect must be articulate and confident, resilient and driven, and sensitive to the source of the real power and how it flows. The architect must look for and see the politics behind the organization and use this insight to build and maintain project support.

Implement the architecture. The architect is essentially a consultant. He educates others on how to use the architecture, reviews designs to make sure they comply with the architecture, and gets input on needs to evolve and improve the architecture. Developers are the ones who must use the architecture; as such, they must understand it. The architect's job is to rally developers behind the target architecture. If he doesn't, the users will quickly revert to the status quo.

Improve the architectural products

Table 3 lists the major technical and business products from each process phase. You can use any of several architecture representation schemes to improve the products' structure and readability.

Initiate the effort. The products in this phase are the architecture framework and the measures that evaluate

Table 2. Skills an architect will need during the architecting process.

Process step	Technical skills	Business skills
Initiate the effort	Deep understanding of technology trends Technical vision Interviewing	Ability to articulate and sell a vision Team building Insightful
Describe where we are	System analysis and synthesis System modeling	Investigative High tolerance for ambiguity
Identify where we'd like to be	System conceptualization System analysis and modeling Technology selection	Deep understanding of business strategy Entrepreneurial and creative Ability to moderate and build consensus
Plan how to get there	Trade-off analysis Project/transition planning Technical reviews and assessments	Practical and pragmatic Resilient Ability to mentor and coach
Implement the architecture	Configuration management Project tracking and monitoring	Empathetic and approachable Committed, dedicated, passionate

Leadership and communication are core skills for every step so that the architect can promote a common vision of the architecture, motivate the team to do its best work, and help people accept needed change.

Table 3. Products in each step of the architecting process. Make sure that business stakeholders understand your measures and models.

Process step	Technical products	Business products
Initiate the effort	Technical drivers Architecture framework	Business drivers Performance measures
Describe where we are	Baseline IT architecture	Current business models
Identify where we'd like to be	Target IT architecture	Target business models Valued outcomes and features
Plan how to get there	IT transition/migration plan IT asset management plan	Capital IT investment plan Procurement strategies/practices
Implement the architecture	Architecture governing practices Information systems	Market research Investment management review

Resources

- **"A Big-Picture Look at Enterprise Architectures," *IT Professional*, Jan./Feb. 1999; "Building an Enterprise Architecture Step by Step," July/Aug. 1999, Frank Armour, Steve Kaisler, and Simon Liu: A two-part series on building an enterprise architecture. Part I defines the components of an EA; Part II shows how to scope an EA project, set up the EA team, and develop a target EA.**
- ***Constructing Blueprints of Enterprise IT Architectures*, Bernard Boar, John Wiley & Sons, New York, 1999: Provides guidance on notations and presents detailed templates for capturing IT architecture descriptions.**
- ***Federal Enterprise Architecture Framework*, v 1.1, Sept. 1999, http://www.cio.gov/files/fedarch1.pdf: Provides a framework that governs EA activities and architecture products.**
- **"The Role of the Architect in Software Development," D. Bredemeyer et al., HewlettPackard, Palo Alto, Calif., 2000: Technical report describing the architect's roles and competencies.**
- **"A Standard for Architecture Description," R. Youngs, *IBM Systems J.*, Vol. 38, No. 1, 1999: Provides an architecture representation scheme with examples.**
- ***Systems Architecting: Creating and Building Complex Systems*, Eberhardt Rechtin, Prentice Hall, Upper Saddle River, N.J., 1991: Describes foundations and basic principles of system architecting. Lots of heuristics.**

the EA's performance. Be sure that the architecture framework captures both business and technical drivers. Business drivers redefine core enterprise business needs. Technical drivers represent new technology or methodologies. The technical drivers must meet the business needs.

Describe where we are. The product in this phase is a comprehensive description of the organization's current state from both the technical and business perspectives. The baseline IT architecture defines the implemented or "as built" data, applications, and technologies that support the current business needs. The business model defines the business needs that the current implementation meets. Take the time to identify current weaknesses and use this information to motivate others to accept architectural change.

Identify where we'd like to be. The target business model defines the future business you must address and the valued outcomes and features new or future designs must accommodate. The target IT architecture defines the future data, applications, and technology that will support the future business needs. Be sure that the target EA is understandable, open, and adaptable and that it aligns with the target business model.

Plan how to get there. This phase produces a practical road map for migrating from the current to the target architecture, as well as a plan to manage IT assets. It also produces an IT capital plan to outline investment decisions that are based on funding, costs, and benefits. Be sure to align procurement activities with transitional processes.

Implement the architecture. The final product is not just the information systems that will collectively implement the target architecture. It is also the set of practices that will govern the architecture's use and maintenance. Business products include

- market research to analyze new and nearly ripe technologies that could benefit the organization and identify
- practices to monitor and track IT investments.

Keeping the architecture alive through proper maintenance and with strong support is critical.

By now it should be clear that many things drive an architecture's value and that the EA effort provides you only the opportunity to create value. Organizations that have discovered this the hard way may be saddled with a failing EA. It's not necessarily too late to revive it. By improving the architecting process, strengthening your chief architect's competencies, or refining the architecture products, you will eventually reenergize the EA and make it successful. The value assessors give you an idea of the work involved, but they are only a framework. How much value an organization actually gets from its architecture depends on many factors. Nonetheless, knowing what makes an architecture valuable will provide you with a solid foundation for the difficult job ahead. ■

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